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Contingent capital and performance of hydroelectric energy projects in Kenya

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ABSTRACT

The purpose of the study was to examine how contingent capital influences the performance of hydroelectric energy projects in Kenya. The study was underpinned on pragmatism paradigm which allows the use of a mixed-method approach and descriptive correlational survey research design. Structured questionnaires and interview guides were used for the collection of quantitative and qualitative data from a sample size of 94 participants out of a target population of 94 subjects. A validity test was done on the instruments and a coefficient of 0.775 obtained using the Content Validity Index while reliability involved pretesting of the instruments amongst the 10% of the participants and Cronbach's alpha coefficient of 0.781 obtained. The analysis was done using both descriptive statistics of mean and standard deviation and inferential statistics of Correlation and Regression at a significance level of 0.05 with the aid of SPSS version 25 and thematic content analysis of qualitative data for triangulation. The hypothesis was tested using Simple linear regression and Pearson Correlation Coefficient models and the result was: H0: Contingent capital does not significantly influence the performance of hydroelectric energy projects in Kenya was rejected since $P=0.000<0.05$. Therefore, the study concluded that there is a significant influence of contingent capital on the performance of hydroelectric energy projects in Kenya. The study provides valuable knowledge on the effectiveness of contingent capital on the performance of hydroelectric energy projects for policy action and adoption by investors. It is recommended that Project management and policymakers should integrate Contingent capital to improve the performance of hydroelectric energy projects besides developing targeted policies for strengthening the implementation of contingent capital. Further research should be carried out on mechanisms of improving utilization of contingent capital in power projects in Kenya.

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Introduction

Financial constraints have impeded Renewable energy projects investments in Africa and Kenya in specific due to investor's negative perception of the region's high investment risk and low creditworthiness. A study by Frisari, Hervé-Mignucci, Micale, and Mazza (2013) showed that in spite of Africa's endowment with substantial renewable energy resources, most of it is under-exploited due to constraints in financial access, for instance, only approximately 7% of the massive hydro potential has been harnessed while in Kenya in spite of having an estimated hydropower potential of about 6,000MW for large hydros (above 10MW) and over 3,000MW for small hydros, only 823.8 MW of large hydros and less than 25MW of small hydros has been exploited as at 2019 (Ministry of Energy, 2020). Expanding economic demand has necessitated investment in power infrastructure in Sub-Saharan Africa and this if well implemented, can increase the estimated average regional GDP from the current 4% to more than 10% (Rosnes and Vennemo, 2009). But due to investors negative perception of Kenya's high investment risk and low creditworthiness, the degree of private capital penetration has generally remained low (OECD, 2013). For this massive infrastructural investment to be realized the financial markets must play critical role in stimulating private investments into the renewable energy development to bridge the scarce resources at disposal of the public sector (Rezec and Scholtens, 2017). Thus, utilization of financial risk management instruments such as Contingent capital to de-risk renewable energy infrastructure projects is essential for reducing private investment cost. However,

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based on market statistics by IEG (2009), reluctance of investors and financial institutions has impeded the financial risk mitigation instruments wide-spread provision and implementation due to the perceived high transaction cost.

Contingent capital provides projects with strong and efficient recapitalization incentives through conversion of the debt instrument to equity when they experience significant equity loss or upon reaching a trigger threshold (Vall'ee, 2016). Tobias and Christoph (2015) defined contingent capital as a debt instrument which automatically converts into equity in a crisis or upon meeting a predefined trigger while this study defines contingent capital as a debt instrument that auto-converts into equity upon reaching a trigger condition or during a financial distress thereby keeping down the cost of capital. Even though contingent capital has gained prominence among regulators, market participants still have some doubts due to its nascence and the limited market experience (Sundaresan and Wang, 2013). If appropriately utilized, contingent capital can reduce systemic risks and default probability compared to pure debt instrument (McDonald, 2011).

The existing funding plans for renewable energy investments in Kenya such as Rural Electrification Master Plan; Sessional Paper No. 4, 2004; Energy Act, 2006; Least Cost Power Development Plan (LCPDP); National Climate Change Response Strategy 2010; Draft Energy Bill, 2015; and Feed-in Tariff (FiT) Policy anchored in Kenya Vision 2030, do not specifically address mechanisms of providing financial risk management instruments such as Contingent capital so as to enable renewable energy projects to secure the much needed massive funding from investors who have the skewed perception of the risky nature of such projects. Renewable energy development thus demands attention on risk mitigation to ensure adequate funds can be solicited from both the local and international financial markets so as to reap from their benefits and improve performance of such project by ensuring their successful completion on schedule, within cost and quality. However, minimal attention has been paid to the appropriate mitigate instruments especially in developing countries (Mutua, Waiganjo and Oteyo, 2014). The study problem is that financing of hydroelectric energy projects remains constrained due to risk barriers in financial access and high sunk cost coupled with investors and developers perception that the projects are highly risky even in the event that the project satisfies the economic feasibility in the long run especially in developing nations like Kenya. The study examined how Contingent capital influence performance of hydroelectric energy projects in Kenya. The study acts as reference to other scholars, policy makers and investors besides contributing valuable knowledge on effectiveness of contingent capital in reducing liquidity risk in hydroelectric energy projects for policy action. The study was organized into introduction, literature review, findings and discussion, and conclusion.

Literature Review

Theoretical and Conceptual Background

Performance of Hydroelectric Energy Projects

An assumption that a successful project is only architect on achieving time schedule, cost budget and quality production "iron triangle", is far from the truth as there are other significant measures such as user satisfaction, safety conditions and efficiency factors that needs further scrutiny (Sibiya, Aigbavboa and Thwala, 2015). The precision of performance indicators in a project is necessary to limit chances of ambiguity while achieving the project objectives (Ofori-Kuragu, Baiden and Badu, 2016). A study by Pramangioulis *et al.*, (2019) in Europe through desk review identified performance indicators for hydroelectric plant as technical performance, friendly environmental effect, economic performance, cost-effectiveness, efficient operation and electricity supply, quality of supply, social performance, user-friendly and legislative performance while Elbatran *et al.*, (2015) in their desk review study of hydropower technologies and turbines found that performance of hydro power systems are measured in terms of increased electricity generation capacity, efficiency of hydroelectric facilities, environmental safety, reduced cost of capital, increased households connection, reduced failure rates and low operation and maintenance cost.

Locally, Waweru and Rambo (2017) investigated determinants of effective hydroelectric power production in Kindaruma Power Station project, in Machakos County, Kenya through descriptive survey design with questionnaire and interview schedule to collect data from a census of 36 respondents while analysis involved descriptive and inferential statistics. Findings revealed that effectiveness of hydroelectric power generation is measured in terms of profitability, increased power supply, improved customer satisfaction and increased household connectivity. Despite previous studies precision and convergence in the measurement of performance in hydroelectric power projects in terms of quality electricity supply, project cost reduction, increased generation capacity or scope, adherence to implementation time schedule, operational efficiency, customer satisfaction, environmental safety and increased profitability (Pramangioulis *et al.*, 2019; Waweru and Rambo, 2017; and Elbatran *et al.*, 2015), none focused on how the performance of hydroelectric energy projects can be influenced by Contingent capital, a gap which the current study intends to fill through descriptive survey design and descriptive and inferential statistical analysis.

Contingent capital and Performance of Hydroelectric Energy Projects

Contingent capital provides projects with strong and efficient recapitalization incentives when they experience significant equity loss or upon reaching a trigger threshold (Calomiris and Herring, 2013). CoCos can equally be used by regulated banks as risk governance tools for limiting regulatory forbearance and supervisors' reluctance to recognize losses (Vall'ee, 2016). For effectiveness, CoCos have to be relatively larger in quantity in comparison to common equity; conversion pricing should be based on a moving average of a quasi-market-value-of-equity ratio; upon trigger CoCos should universally be converted; and the conversion ratio should be dilutive

of preexisting equity holders (Tobias and Christoph, 2015). Regulatory objectives for CoCo requirements differs and can range from signaling of bank risk, ensuring that banks that suffer significant losses voluntarily and timely offer equity into the market and facilitation of bail-ins (Sundaresan and Wang, 2013).

Tobias and Christoph (2015) assessed CoCo bonds conversion price effects on equity holders' incentives. The study adopted a theoretical model of Duffie-Lando type and used descriptive techniques and inferential techniques of correlation and regression to analyze first and second hypothesis using panel data of contingent capital issued by three major banks from 2009-2013. Findings showed that CoCo bonds have a magnitude five times greater compared to straight bonds thus banks equity holders can use it to create perverse incentives. By exclusively using regulatory triggers or conversion, CoCo bond holder transfer wealth to equity holder, thus, living equity holders with the discretion and incentive of increasing asset riskiness "asset substitution" and equally the disincentive to raise fresh equity in a crisis "debt overhung". This is a strong indicator of how contingent capital can help reduce liquidity risk in a project.

Further, Vall'ee (2016) through desk review explored the effects of triggering contingent capital instrument as a form of liability management exercise and found that subordinated debt bond investors experienced significant losses due to the massive implementation of liability management exercises by the financial institutions following the 2007/08 financial distress. For higher economic performance, liability management exercises are important as they preserve the lending activity from their own users thereby robustly controlling seasonal equity offering and government bail-outs. Observations also showed that contingent capital offers cheaper recapitalization costs compared to ordinary equity offerings, hence limiting the cost of financial distress (Vall'ee, 2016).

Similarly, Shang (2013) through desk review explored the contingent capital market, its key features, pricing and valuation tools and its insurance industry application. Findings indicated that contingent capital increases loss absorption capacity "risk tolerance" and lowers cost of capital compared to subordinated debt instrument and equity respectively. Though contingent capital has received significant acceptance amongst regulators its success still remains in doubt since designing appropriate trigger without multiple equilibria is a tall order as a slight change can lead to a huge impact on its effectiveness of reducing default chances and; the rational and irrational behavior of stakeholders in relation to the trigger threshold needs closer observation as this may further drag down the issuer near conversion instead of helping stay above as intended thus creating complexity and uncertainty in valuation, risk assessment and pricing of contingent capital (Shang, 2013). At no point has research linked contingent capital utilization and performance of hydroelectric energy projects, an issue that this research intends to investigate. More so, contingent capital seems to have been acknowledged in mature financial markets as financial risks mitigate but not in developing financial markets like that of Kenya.

Research and Methodology

The study was underpinned on pragmatism paradigm and descriptive correlational survey research design which allows generation and testing of hypothesis through mixed method approach involving simultaneous and independent undertaking of qualitative and quantitative research and triangulation of results to deduce in-depth knowledge of the problem under study without manipulating the environment (Wambugu, Kyalo, Mbii, and Nyenje, 2015; Creswell, 2013), hence, neutralizes biases and limitations inherent in any single method (Teddlie and Tashakkori, 2009). The target population had 94 subjects consisting of 84 respondents and 10 Key Informants. The study sample size comprised all the 94 participants "Census", which were proportionately distributed across all the 12 hydroelectric energy projects in the study area and the agencies concerned with the variables under study. The 84 respondents comprised of project manager, finance manager, communications manager, quality assurance manager, hydroelectric plant technician, hydroelectric operator, hydroelectric engineer drawn from the 12 hydroelectric energy projects while the 10 Key Informants (finance managers) were drawn from relevant government ministry and agencies like Ministry of Energy, Ministry of Finance, Energy Regulatory Commission, Kenya Power and Lighting Company, Kenya Electricity Transmission Company, Geothermal Development Company, Capital Markets Authority, Nairobi Security Exchange and Insurance Regulatory Authority to provide insight of Alternative Risk Transfer utilization in hydroelectric energy projects. The study used both primary and secondary data to source for information concerning Alternative Risk Transfer and performance of hydroelectric energy projects. For the case of primary data, structured questionnaire was used to collect quantitative data while an Interview Guide was used to collect qualitative data from Key Informants drawn from power related government agencies. Secondary data was sourced through organizational records, desk review of journals, policy and research papers, published books and internet search based on the research themes. The questionnaire and the Key informant interview were pre-tested in 10% of unselected participants and a validity coefficient of 0.775 and reliability coefficient of 0.781 obtained. Analysis involved descriptive statistics of mean and standard deviation and inferential statistics of correlation and regression to fulfill research objective, test hypothesis and show the relationship between the variables at a significance level of 0.05. The qualitative data was analyzed manually through descriptive statistics of thematic content analysis method that follows an interview question approach. A simple regression model was adopted to test the hypothesis: H_0 : There is no significant relationship between Contingent capital and performance of hydroelectric energy projects in Kenya

Performance= f (Contingent capital, random variable)

$$Y = \beta_0 + \beta_1 X_1 + \alpha$$

Findings and Discussion

The study realized a 100% questionnaire return rate. The study sought to examine how Contingent capital influence performance of hydroelectric energy projects in Kenya. Participants gave opinions on their level of agreement or disagreement with the statements of contingent capital on a Likert scale of 1-5 where Strongly agree(SA)=5, Agree(A)=4, Neutral(N)=3, Disagree(D)=2 and Strongly disagree (SD)=1. Table 1 provides detailed results on the contingent capital and performance of hydroelectric energy projects.

Table 1: Contingent Capital and Performance of Hydroelectric Energy Projects

Statements	SA	A	N	D	SD	Mean	Std. dev
CC1	33(39.3%)	50(59.5%)	1(1.2%)	0(0.00%)	0(0.00%)	4.38	0.513
CC2	52(61.9%)	32(38.1%)	0(0.00%)	0(0.00%)	0(0.00%)	4.62	0.489
CC3	73(86.9%)	10(11.9%)	1(1.2%)	0(0.00%)	0(0.00%)	4.86	0.385
CC4	38(45.2%)	41(48.8%)	5(6.0%)	0(0.00%)	0(0.00%)	4.39	0.602
CC5	1(1.2%)	16(19%)	53(63.1%)	14(16.7%)	0(0.00%)	3.05	0.638
CC6	57(57.9%)	27(32.1%)	0(0.00%)	0(0.00%)	0(0.00%)	4.68	0.470
CC7	27(32.1%)	26(31%)	28(33.3%)	3(3.6%)	0(0.00%)	3.92	0.895
CC8	1(1.2%)	9(10.7%)	25(29.8%)	48(57.1%)	1(1.2%)	2.54	0.752
CC9	17(20.2%)	45(53.6%)	21(25%)	1(1.2%)	0(0.00%)	3.93	0.708
CC10	4(4.8%)	22(26.2%)	43(51.2%)	15(17.9%)	0(0.00%)	3.18	0.779
Composite mean and	30(35.7%)	28(33.3%)	18(21.4%)	7(8.3%)	1(1.2%)	3.95	0.344
Composite standard deviation							

NB. CC1-10 is the statements of Contingent Capital

Ten statements were developed to measure the extent to which contingent capital influence performance of hydroelectric energy projects. Statement (CC1) that ‘contingent capital provides leverage in good times through timely conversion’ had a mean of 4.38 and standard deviation of 0.513. The results indicate that out of 84 participants, 50(59.5%) agreed, 33(39.3%) strongly agreed while 1(1.2%) were neutral that through timely conversion, contingent capital provide financial leverage. This result shows that the line statement mean of 4.38 and standard deviation of 0.513 were above composite mean of 3.95 and standard deviation of 0.344; This results implies that contingent capital provide leverage in good times through timely conversion, proper pricing and evaluation models to avoid multi equilibria thereby positively influencing the performance of hydroelectric energy projects. The study results supports finding by Calomiris and Herring (2013) who found that Contingent capital provides projects with strong and efficient recapitalization incentives when they experience significant equity loss or upon reaching a trigger threshold.

Statement (CC2) that ‘contingent capital provide buffer to absorb losses during financial distress’ had a mean of 4.62 and standard deviation of 0.489. The results indicate that out of 84 participants, 52(61.9%) strongly agreed that contingent capital provide buffer to absorb losses during financial distress, 32(38.1%) agreed that contingent capital provide buffer to absorb losses during financial distress. This result show that the line statements mean of 4.62 and standard deviation of 0.489 were above composite mean of 3.95 and standard deviation of 0.344. This result implies that contingent capital provide buffer to absorb losses during financial distress thereby positively influencing the performance of hydroelectric energy projects. The study results support finding by Vall’ee (2016) who indicated that contingent capital can reduce financial distress by injecting liquidity to the project thereby robustly controlling seasonal equity offering and government bail-outs.

Statement (CC3) that ‘contingent capital provides relief for debt servicing obligation in bad times due to reduction of coupon of straight debt’ had a mean of 4.86 and standard deviation of 0.385. This result indicates that out of 84 participants, 73(86.9%) strongly agreed, 10(11.9%) agreed while 1(1.2%) were neutral that contingent capital provides relief for debt servicing obligation in bad times due to reduction of coupon of straight debt. This result shows that the line statement mean of 4.86 and standard deviation of 0.385 were above composite mean of 3.95 and standard deviation of 0.344; This results implies that contingent capital provides relief for debt servicing obligation in bad times due to reduction of coupon of straight debt and expected bankruptcy costs; thereby positively influencing the performance of hydroelectric energy projects. The study results support finding by McDonald (2011) who showed that contingent capital reduces default probability during financial distress due to tax deductibility advantage and reduction in expected bankruptcy cost thus lowering cost of capital relative to risk compared to contemporary equity requirement and pure debt instrument.

Statement (CC4) that 'contingent capital provides strong incentives for the prompt recapitalization in the event of increased risk' had a mean of 4.39 and standard deviation of 0.602. The results indicate that out of 84 participants, 41(48.8%) agreed, 38(45.2%) strongly agreed while 5(6%) were neutral that contingent capital provide strong incentives for the prompt recapitalization in the event of increased risk. The result shows that the line statements mean of 4.39 and standard deviation of 0.602 was above composite mean of 3.95 and standard deviation of 0.344. This result implies that contingent capital provide strong incentives for the prompt recapitalization in the event of increased risk, "bail-in" objective and hence positively influence the performance of hydroelectric energy projects. The study results support findings by Sundaresan and Wang (2013) that contingent capital ensures timely offering of equity into the market and facilitation of bail-ins.

Statement (CC5) that 'contingent capital reduces moral hazard of market manipulation through credible signal of default risk' had a mean of 3.05 and standard deviation of 0.638. This result indicate that out of 84 participants, 53(63.1%) were neutral that contingent capital contain moral hazard of market manipulation through credible signal of default risk, 16(19%) agreed that contingent capital contain moral hazard of market manipulation through credible signal of default risk, 14(16.7%) disagreed that contingent capital contain moral hazard of market manipulation through credible signal of default risk and 1(1.2%) strongly agreed that objective contingent capital contain moral hazard of market manipulation through credible signal of default risk. The result shows that the line statement mean of 3.05 and standard deviation of 0.638 were below composite mean of 3.95 and standard deviation of 0.344; This result implies that contingent capital does not contain moral hazard of market manipulation through credible signal of default risk and provision of incentives for projects to avoid use of conversion facility 'signaling objective' and hence negatively influence the performance of hydroelectric energy projects. The study results contradict findings by Calomiris and Herring (2013) and McDonald (2011) that showed that contingent capital can reduce systemic risks and default probability by reducing multiple equilibria. Lack of equilibrium creates multiplicity with a potential of uncertainty in price, manipulation of the market, inefficiency in capital allocation besides frequent conversion errors (Sundaresan and Wang, 2013).

Statement (CC6) that 'contingent capital ensures reduced cost of capital relative to risk due to accounting tax advantage' had a mean of 4.68 and standard deviation of 0.470. This result indicates that out of 84 participants, 57(67.9%) of strongly agreed that contingent capital ensure reduced cost of capital relative to risk due to accounting tax advantage and 27(32.1%) agreed that contingent capital ensure reduced cost of capital relative to risk due to accounting tax advantage. The result show that the line statement means of 4.68 and standard deviation of 0.470 were above the composite mean of 3.95 and standard deviation of 0.344. The results imply that contingent capital ensure reduced cost of capital relative to risk than a simple equity requirement due to accounting tax advantage and hence positively influence the performance of hydroelectric energy projects. The study results support finding by Shang (2013) that contingent capital improves financial industry's risk tolerance and cheaper capital compared to subordinated debt instrument and equity respectively.

Statement (CC7) that 'contingent capital provides a strong incentive to raise equity before facing insolvency risk' had a mean of 3.92 and standard deviation of 0.895. This result indicate that out of 84 participants, 28(33.3%) were neutral that contingent capital provide a strong incentive to raise equity before facing insolvency risk, 27(32.1%) strongly agreed that contingent capital provide a strong incentive to raise equity before facing insolvency risk, 26(31%) agreed that contingent capital provide a strong incentive to raise equity before facing insolvency risk and 3(3.6%) disagreed that contingent capital provide a strong incentive to raise equity before facing insolvency risk. The result shows that the line statement mean of 3.92 and standard deviation of 0.895 were slightly below the composite mean of 3.95 and standard deviation of 0.344; The results implies that contingent capital moderately provide incentive to strengthen risk management by raising equity to avoid insolvency risk and hence moderately influence the performance of hydroelectric energy projects. The study results supports findings by Vall'ee (2016) and Christoph (2015) that contingent capital can be used as risk governance tool for limiting regulatory forbearance and supervisors' reluctance to recognize losses and as such can be turned into equity before the project becomes insolvent.

Statement (CC8) that 'contingent capital eliminates problems of enforcing book capital requirements' had a mean of 2.54 and standard deviation of 0.752. The results indicate that out of 84 participants, 48(57.1%) disagreed that contingent capital eliminates problems of enforcing book capital requirements, 25(29.8%) were neutral that contingent capital eliminates problems of enforcing book capital requirements, 9(10.7%) of the respondent agreed that contingent capital eliminates problems of enforcing book capital requirements, 1(1.2%) strongly agreed that contingent capital eliminates problems of enforcing book capital requirements and 1(1.2%) strongly disagreed that contingent capital eliminates problems of enforcing book capital requirements. This results shows that the line statement mean of 2.54 and standard deviation of 0.752 were below the composite mean of 3.95 and standard deviation of 0.344; This results implies that contingent capital does not eliminates problems of measurement and enforcement of book capital requirements and hence negatively influence the performance of hydroelectric energy projects. The study results contradicts finding by Calomiris and Herring (2013) that contingent capital eliminates problems of measuring and enforcing book capital requirements.

Statement (CC9) that 'contingent capital decrease incentives to raise new equity in a crisis which helps maintain shareholders value' had a mean of 3.93 and a standard deviation of 0.708. This result indicate that out of 84 participants, 45(53.6%) agreed, 21(25%) were neutral while 17(20.2%) strongly agreed that contingent capital decrease incentives to raise new equity in a crisis which helps maintain shareholders value and 1(1.2%) disagreed that contingent capital reduces incentives to raise fresh equity in a crisis which helps maintain shareholders value. This results shows that the line statement mean of 3.93 and standard deviation of 0.708 were slightly below the composite mean score of 3.95 and standard deviation of 0.344; This results implies that contingent capital

moderately decrease incentives to raise new equity in a crisis so as to lower chances of diluting shareholders value and hence moderately influence the performance of hydroelectric energy projects. The study results support finding by Tobias and Christoph (2015) who found that contingent capital can reduce financial distress by injecting liquidity to the project thereby robustly controlling seasonal equity offering and government bail-outs.

Statement (CC10) that 'contingent capital supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level' had a mean of 3.18 and standard deviation of 0.779. This result indicate that out of 84 participants, 43(51.2%) were neutral that contingent capital supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level, 22(26.2%) agreed that contingent capital supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level, 15(17.9%) disagreed that contingent capital supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level and 4(4.8%) strongly agreed that contingent capital supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level. This results shows that the line statement mean of 3.18 and standard deviation of 0.778 were below the composite mean of 3.95 and standard deviation of 0.344; This results implies that contingent capital does not supplement supervisory oversight with market discipline by reducing management intent of taking excessive risk above tolerance level and hence negatively influence the performance of hydroelectric energy projects. The study results contradicts finding by Vall'ee (2016) who observed that contingent capital can be used as risk governance tool for limiting regulatory forbearance and supervisors' reluctance to recognize losses.

The overall composite score of all indicators of Contingent capital had a mean of 3.95 with standard deviation of 0.344 and further, a majority 58(69%) of respondents at least agreed that Contingent capital influence performance of hydroelectric energy projects. The study results corroborate with similar findings by Calomiris and Herring (2013), Vall'ee (2016) and Tobias and Christoph (2015) who found that Contingent capital influence performance of projects.

These findings were further supported by qualitative data and this is what the participant had to say on influence of Contingent capital on performance of hydroelectric energy projects. The interviewee from KenGEN said that *"...due to the need to expand and initiate new energy infrastructure projects in 2016 demanding huge capital which was way above the institutions debt to equity threshold, the government had to convert its debt of Kshs 20.2 billion into equity before raising additional equity of Kshs 6.4 billion through Rights Issue to facilitate the infrastructural expansion."* Further, contingent capital ensures prompt recapitalization and efficient liquidity flow which is key to systemic risk management of the projects. This was evident from the remark of NSE interviewee who stated *"...in general prompt recapitalization by contingent capital enables investors to cheaply and easily acquire the much needed capital to facilitate the implementation of projects."*

However, without certainty of equilibrium, contingent capital faces the challenge of equilibria multiplicity with a potential of uncertainty in price, manipulation of the market, and inefficiency in capital allocation. To contain the equilibrium problem, market triggered contingent capital should be handled cautiously as a regulatory tool.

Correlation analysis of Contingent Capital and Performance of Hydroelectric Energy Projects

The study examined the relationship between Contingent capital and Performance of Hydroelectric Energy projects. Pearson correlation coefficient was used to test the relationship between Contingent Capital and Performance of Hydroelectric Energy Projects; this was done at 95% level of confidence. To test the extent of the relationship between Contingent capital and Performance of Hydroelectric Energy projects; all indicators of Contingent capital and Performance of Hydroelectric Energy projects were analyzed based on the following hypothesis 2. H_0 : There is no significant relationship between Contingent Capital and Performance of Hydroelectric Energy Projects. The corresponding mathematical model for the hypothesis was identified as follows: Performance Hydroelectric Energy projects = $f(\text{Contingent capital})$.

The research study revealed that out of the ten statements of contingent capital; three statements namely Statement5(Contingent capital contain moral hazard of market manipulation through credible signal of default risk $r=-0.423$, $P\text{-value}=0.102>0.05$), Statement8(Contingent capital eliminates problems of enforcing book capital requirements; $r=-0.419$, $P\text{-value}=0.08<0.05$) and Statement10(Contingent capital supplement supervisory oversight with market discipline by reducing management's intent of taking excessive risk above tolerance level; $r=-0.480$, $P\text{-value}=0.120<0.05$) did not have significant correlation whereas seven statements namely: Statement 1(Contingent capital provides leverage in good times through timely conversion; $r=0.538$, $P\text{-value}=0.000<0.05$), statement2(Contingent capital provides buffer to absorb losses during financial distress; $r=0.412$, $P\text{-value}=0.003<0.05$), Statement3(Contingent capital provides relief for debt servicing obligation in bad times due to reduction of coupon of straight debt; $r=0.453$, $P\text{-value}=0.001<0.05$), statement4(Contingent capital provide strong incentives for prompt recapitalization in the event of increased risk; $r=0.476$, $P\text{-value}=0.000<0.05$), Statement 6(Contingent capital ensure reduced cost of capital relative to risk due to accounting tax advantages; $r=0.588$, $P\text{-value}=0.000<0.05$), Statement7 (Contingent capital provide a strong incentive to raise equity before facing insolvency risk; $r=0.504$, $P\text{-value}=0.000<0.05$), Statement 9(Contingent capital reduces incentives to raise fresh equity in a financial distress which helps maintain shareholders value; $r=0.504$, $P\text{-value}=0.000<0.05$), had significant correlation.

Similarly the overall correlation coefficient for Contingent capital and Performance of Hydroelectric Energy projects was found to be $r= 0.895$ with a $p\text{-value}$ of $0.000<0.05$, which implies that there is a significant relationship between Contingent capital and

Performance of Hydroelectric Energy projects leading to rejection of the null hypothesis (2. H_0 : There is no significant relationship between Contingent capital and Performance of Hydroelectric Energy projects) and acceptance of the alternative hypothesis, and hence the research findings conclude that there is significant relationship between Contingent capital and Performance of Hydroelectric Energy projects. The correlation results are in tandem with the descriptive overall composite mean scores of 3.95 and standard deviation of 0.344 which indicating that participants agreed that Contingent capital influence Performance of Hydroelectric Energy projects. This findings is in agreement with studies done by Vall'ee (2016), Tobias and Christoph (2015), Calomiris and Herring (2013), Sundaresan and Wang (2013) and McDonald (2011), who found that there is significant relationship between Contingent capital and Performance of projects thus leading to the generalization that contingent capital improves performance of projects by injecting liquidity in case of a financial crisis.

Table 2: Correlations of Capital Contingent and Performance of Hydroelectric Energy Projects (n=84); NB * Correlation significant at 0.05 level (2-tailed)

Contingent Capital indicators		Performance of hydroelectric energy projects
CC1	Pearson Correlation	0.538*
	Sig. (2-tailed)	0.000
CC2	Pearson Correlation	0.412
	Sig. (2-tailed)	0.003
CC3	Pearson Correlation	0.453**
	Sig. (2-tailed)	0.001
CC4	Pearson Correlation	0.476
	Sig. (2-tailed)	0.000
CC5	Pearson Correlation	-0.423*
	Sig. (2-tailed)	0.102
CC6	Pearson Correlation	0.588
	Sig. (2-tailed)	0.000
CC7	Pearson Correlation	0.504
	Sig. (2-tailed)	0.000
CC8	Pearson Correlation	-0.419
	Sig. (2-tailed)	0.403
CC9	Pearson Correlation	0.080
	Sig. (2-tailed)	0.000
CC10	Pearson Correlation	-0.504
	Sig. (2-tailed)	0.120
Overall correlation for capital contingent		Pearson Correlation
		0.895
		Sig. (2-tailed)
		0.000

Regression Analysis of Contingent Capital on Performance of Hydroelectric Energy Projects

Simple linear regression was adopted to investigate how Contingent capital influence Performance of Hydroelectric Energy projects. The rational of using the simple regression model was to establish how Contingent capital as a predictor significantly or insignificantly predicted Performance of Hydroelectric Energy projects.

The model summary table suggest that there is a strong positive correlation ($R=0.895$) between Contingent capital and Performance of Hydroelectric Energy Projects and those predicted by the regression model. In addition, 80.2% ($R^2=0.802$) of the variance in the Performance of Hydroelectric Energy projects is explained by Contingent capital. The results are consistent with the findings by Vall'ee (2016), Tobias and Christoph (2015), Calomiris and Herring (2013), Sundaresan and Wang (2013) and McDonald (2011); that suggest significant relationship between Contingent capital and Performance of projects. The regression model summary is presented in Table 3.

Table 3: Regression Model Summary table of Contingent capital and Performance of Hydroelectric Energy Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.895 ^a	0.802	0.799	0.318

a. Predictors: (Constant), aggregated score of Contingent capital Indicators

The study sought to establish if the regression model is best fit for predicting Performance of Hydroelectric Energy projects after use of contingent capital. The ANOVA results indicated that (F-statistics (1,82) =331.805 is significant at P-value =0.000<0.05; implying that the regression model results is significantly better prediction of Performance of Hydroelectric Energy Projects. The regression ANOVA output statistics results are shown in Table 4.

Table 4: An ANOVA of the Regression of Contingent Capital and Performance of Hydroelectric Energy Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.477	1	33.477	331.805	0.000 ^b
	Residual	8.273	82	0.101		
	Total	41.750	83			

a. Dependent Variable: aggregated Performance of Hydroelectric Energy Projects.

b. Predictors: (Constant), aggregated score of contingent capital

The study sought to examine whether there was influence of contingent capital on Performance of Hydroelectric Energy projects. The simple linear regression coefficients results indicated that there was significant influence of contingent capital on Performance of Hydroelectric Energy projects given P-Value =0.000<0.05. The regression model for contingent capital was $Y = 1.773 + 0.629X_2$; implying that for each unit of contingent capital use, Performance of Hydroelectric Energy projects marginally changed by 0.629 units. The results are consistent with the findings by Vall'ee (2016), Tobias and Christoph (2015), Calomiris and Herring (2013), Sundaresan and Wang (2013) and McDonald (2011); that found a significant influence of contingent capital on Performance of Hydroelectric Energy Projects. The regression coefficients results are in Table 5.

Table 5: Coefficients for the Regression of contingent capital and Performance of Hydroelectric Energy projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.773	0.140		12.631	0.000
	Contingent capital	0.629	0.035	0.895	18.216	0.000

a. Dependent Variable: Performance of Hydroelectric Energy Projects

Conclusions

Based on the study results that regression coefficients p-values (0.000<0.05) and correlation p-values (0.000<0.05), there was significant influence of Contingent capital on Performance of Hydroelectric Energy projects; leading to rejection of the null hypothesis H_0 : There is no significant relationship between contingent capital and Performance of Hydroelectric Energy projects; and the conclusion that there is significant relationship between Contingent capital and Performance of Hydroelectric Energy projects. Thus, contingent capital in hydroelectric energy projects reduces financial distress by injecting liquidity and offering cheaper capital compared to subordinated debt instrument and contemporary equity respectively besides reducing government bail-outs, decreasing default probability and improving projects' risk tolerance. This eventually reduces the cost of capital and increases creditworthiness of a project which results into reduced investor's negative perception on the riskiness of hydroelectric energy projects. Based on the findings, the study recommends targeted policy enactment by governments for integration of Contingent capital in hydroelectric energy projects and awareness creation on the operations of Contingent capital to the instruments providers and investors in hydroelectric energy projects.

This study was delimited to Kenya and on hydroelectric energy projects alone and therefore, a study can be replicated in other developing countries and in projects other than hydroelectric energy projects to explain the possibility of other environmental factors for generalizability of the findings.

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